

*If you are using a printed copy of this procedure, and not the on-screen version, then you **MUST** make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are available by contacting the ESSHQ Procedures Coordinator, Bldg. 911A*

## C-A OPERATIONS PROCEDURES MANUAL

### 15.5.2 Install/Remove 10' Straight Section in AGS

(Vacuum Group Procedure VA-008.18.1.2)

Note: This document was formerly a C-A Group Procedure. The content of the group procedure was verified for safe and reliable use as an OPM Procedure. All approvals and/or issue dates of the original group procedure are maintained for present use.

#### Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
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Approved: \_\_\_\_\_ **Signature on File** \_\_\_\_\_  
Collider-Accelerator Department Chairman Date

S. Gill

Vacuum Group Procedure VA-008.18.1.2  
Original Issue Date: 01/01/00  
Revision 01

**\*\*IMPORTANT\*\***

PRIOR TO THE PERFORMANCE OF ANY WORK WITHIN THE SCOPE OF THIS PROCEDURE, IT IS THE RESPONSIBILITY OF THE SUPERVISOR TO ENSURE THAT ***ENHANCED WORK PLANNING*** HAS BEEN REVIEWED FOR THE PROTECTION OF WORKERS, EQUIPMENT, AND THE ENVIRONMENT.

**1. Purpose:**

- 1.1 To provide an effective procedure for AGS Vacuum Technicians to remove and/or install a 10-ft. straight section.

**2. Responsibilities:**

- 2.1 The AGS Vacuum Supervisor shall be responsible for the implementation of this procedure.

**3. Discussion:**

- 3.1 This procedure is written so that trained AGS Vacuum Technicians will be able to successfully and efficiently remove and/or install a 10-ft. straight section in a safe and proper manner. In some cases, a 10-ft straight section is simply a 10-ft. (103") length of pipe without any extraneous equipment (i.e. = quad or sextupole magnet) attached to it. In other cases it could be an RF cavity or beam component magnet or instrumentation.

**4. Precautions:**

- 4.1 The technician shall be aware of radiation levels in the area and, where required, shall obtain a radiation work permit.
- 4.2 The technician will ensure that he is in fact using a safe and properly functioning gas regulator and bottle cart. Those found to be unsafe shall be returned for repair.
- 4.3 The technician should be aware of what constitutes a vacuum sector. For example, sector "AB" starts at A14 and ends at the B3 main magnet. Sector "B" starts at B4 and ends at the B13 main magnet. A schematic representing the entire AGS layout is posted in the vacuum lab.
- 4.4 The technician shall not remove any materials or equipment from the AGS ring unless they are first checked by health physics.
- 4.5 Check color code on Kirk Key & verify that it matches that of the hv cables in the locked out sector.

**5. Prerequisites:**

- 5.1 The technician will have been trained in this procedure.
- 5.2 Lockout/Tagout 15.17.00.02
- 5.3 Electrical Safety 15.17.00.04
- 5.4 AGS Ring Access Training
- 5.5 Activation Worker Training (BNL OH&S Guide 3.5.0)
- 5.6 Safety glasses are required during this procedure.
- 5.7 White lint-free gloves are required during this procedure.
- 5.8 Technician has been trained to at least a level of knowledgeable in LO/TO AGS/HEBT vacuum pump power disconnects.

- 5.9 Affected Person Training 15.12.00.01
- 5.10 A hard hat may be required during this procedure (if rigging).

**6. Operational procedure for removal:**

- 6.1 Ensure that a radiation survey has been done by the HP Group of the area to be worked in.
- 6.2 Close sector valves and disconnect power to those valves U/S and DIS of sector to be vented.
- 6.3 Perform LOTO procedures for ION Pump HV supplies
- 6.4 Perform LOTO procedures for Sector CCG.
- 6.5 Vent sector to atmosphere as per procedure #8.18.1.1
- 6.6 Check with Maint. Coordinator to see if survey required for this procedure.
- 6.7 Remove flange R-C networks and/or shorting bars.
- 6.8 Remove clamps, retainers and seals.
- 6.9 Protect flanges before removal by crane.
- 6.10 Scrap seals in 'yellow' radiation waste barrels in ring.
- 6.11 Remove straight section from girder.
- 6.12 Take radiation 'smear' of chamber and tag appropriately (H-P).
- 6.13 Cover ends of straight section with rubber boots or foil.
- 6.14 Transport straight section to north conjunction area or Bldg.975.
- 6.15 If going to Bldg.975, log out in ring book & into Bldg..975 book.

**7. OPERATIONAL PROCEDURE FOR INSTALLATION:**

- 7.1 Carefully place straight section on stands on girder.
- 7.2 Install new clamps & seals as per Procedure #8.18.1.6
- 7.3 Check straight section for shorts (el group).
- 7.4 Start roughing and leak check Procedure #8.18.1.20
- 7.5 Install flange R-C networks & shorting bars.
- 7.6 Remove red tags from ION Pump P.S. and CCG.
- 7.7 Proceed with sector start-up procedure #8.18.1.53

**8. ACCEPTANCE CRITERIA:**

- 8.1 Straight section has been removed and/or installed and sector has achieved vacuum integrity.

**9. FINAL CONDITIONS:**

- 9.1 Work area has been cleaned and all equipment and/or tools have been removed from the ring after being checked by H-P personnel.
- 9.2 Dosimeter readings have been logged in the dosimeter log book located in the vacuum lab.